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JUN 18 2002

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Peter R. BEETHAM, et al.

Appln. No.:09/685,403

Confirmation No.: 4644

Filed: October 10, 2000

Docket No: CA1163

Group Art Unit: 1638

Examiner: KRUSE, David H.

For: NON-TRANSGENIC HERBICIDE RESISTANT PLANTS

SUBMISSION OF FORMAL DRAWINGS

Commissioner for Patents
Washington, D.C. 20231

Sir:

Submitted herewith please find 14 sheet(s) of formal drawings. The Examiner is respectfully requested to acknowledge receipt of these formal drawings.

The submitted drawings incorporate the proposed drawing changes approved in the Office Action mailed 13 February 2002 (one-month extension) and are believed to obviate the informalities indicated on Form PTO-948 attached to that Office Action.

Respectfully submitted,

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Commissioner for Patents
Washington, D.C. 20231

Date: June 13, 2002

Signed:

Elaire E. Cohnquin

DNA sequence:

cccttcatgtcttttgtagaaaccccattatctttcttagggcccaattgaaaacccacattttctttcacctaaccca
ccaaagccttgcacatgttgacgtgaacaccaaactaacacgtgtcatactgccagtggttatgataaatgctcatacc
ataccagagtcatagagttttggttggtgaaagatttgacggatgccttcttctcatttctcaccaactccctccaaa
cccaacaaaatgtttatattagcaaagccgccaaagtgtaaacgaaagtttataaatttcatttctgtgatcttacgta
attggaggaagatcaaattttcaatccccattcttcgattgcttcaattgaagtttctccg

[transit peptide start]

ATGGCGCAAGTTAGCAGAATCTGCAATGGTGTGCAGAACCCATCTCTTATCTCCAATCTCTCGAAATCCAGTCAACGCA
AATCTCCCTTATCGGTTTCTCTGAAGACGCAGCAGCATCCACGAGCTTATCCGATTTCGTCGTCGTGGGGATTGAAGAA
GAGTGGGATGACGTTAATTGGCTCTGAGCTTCGTCCTCTTAAGGTCATGTCTTCTGTTTCCACGGCGGAG

[mature peptide starts]

AAAGCGTCGGAGATTGTACTTCAACCCATTAGAGAAATCTCCGGTCTTATTAAGCTTCCTGGCTCCAAGTCTCTATCAA
ATCGGATCCTGCTTCTCGCTGCTCTGTCTGAGGTATATATCACTTCGTTTCGTCCTTCTCTGTAATCTGAACTTAGATT
ATAAAGATTGATACTTTACCATTTTGCTGTGGTTTTATAGGGAACAACTGTAGTGGACAACTTGTTGAATAGCGATGAC
ATCAATTACATGCTTGATGCGTTGAAGAGATTGGGACTTAATCTCGAAACTGACAGTGAAAATAATCGTGCTGTAGTTG
AAGGATGTGGCGGGATATTCCCAGCTTCCATAGATTCAAAGAGTGATATCGAACTTTACCTCGGTAATGCA**GGAACA**GC
AATGCGT**CCA**CTTACCGCTGCGGTCACTGCTGCAGGTGGAAACGCAAGGTAGATTGAAGGAGTTGATGCTTCTTGGTAT
TTGATGTTTAAGGAATGGAGCTTTTGTTGATGCTTTATGATCCATTTATTCCAGTTATGTGCTTGATGGGGTGCCTCGT
ATGAGAGAAAGACCTATAGGGGATTTGGTTGTTGGTCTTAAGCAGCTTGGTGCTGATGTTGAATGTACTCTTGGAACTA
ACTGCCCTCCTGTTCGTGTCAACGCTAATGGTGGCCTTCCCGGTGGAAAGGTTAGATCTTGCAAATGGCATGTGAATAT
GTAATCTCGTTCCTTACTCTATGAACACTTGCAGAAATGTGTGTTCATCATAGCCTTAGCTTGACAAGATTTCAGTTTT
TAATCTACTCTCAACGGATGGATCCTAAAATAGAATCGGATTTGGTGATTGGTTTTCGTTCTCGATTACCGTTTTCGTT
GTATGATTTCTTGATTAACAATTAGGAGACATGTTATGCATTTGCAGGTGAAGCTTTCTGGATCAATTAGTAGTCAGTA
CTTGACTGCTCTGCTCATGTCTGCTCCCTTAGCTCTTGGAGACGTCGAGATTGAGATTGTCGATAAATTAATTTCTGTT
CCATATGTTGAAATGACATTGAAGTTGATGGAACGTTTCGGGGTTAGTGTCGAGCATAGTGATAGCTGGGATCGTTTCT
TTGTCAAGGGCGGGCAAAAATACAAGTAGGAGTTATTCTTTTCTTCCTTTTCTGAAATCACATCCCTTAGCTTGACAAT
ATAATGACTAAAAGGTGAATGATTCAGGTCTCCGGGTAATGCGTATGTAGAAGGTGATGCTTCTAGTGCATGTTATTTC
TTGGCTGGTGCTGCCATTACCGGTGAAACTGTCACAGTCGAAGGTTGTGGAACTACCAGCTTGCAGGTAATATTTGTAC
ACTGAATCATCGACGAGGCTGTTAAGTTTATAGTGAAATTCGTCTAGGTCAAAGTTTCATCTTTTGACAAGTTGTATAT
AACATATTCGCAAGATTCTAAGCTCAATTTTTGTGATGAATCTCTAGGGAGATGTAAAATTCGCCGAGGTCCTTGAGAA
AATGGGATGTAAAGTGTCCTGGACAGAGAACAGTGTGACTGTGACAGGACCACCTAGAGATGCTTTTGGAATGAGACAC
TTGCGGGCTATTGATGTCAACATGAACAAAATGCCTGATGTAGCCATGACCCTTGCCGTCGTTGCTCTCTTTGCTGACG
GTCCAACCACCATTAGAGATGGTAAGTAAAAAGCTCTCTCTTATAATTAAGGTTTCTCAATATTCATGATCACTTAATT
CTGTTTGGTTAATATAGTGGCTAGCTGGAGAGTAAAGGAGACAGAAAGGATGATTGCCATTTGCACAGAGCTTAGAAAA
GTAAGAGATTCTTATCTCTCTCTTTCTGTCTCTTGACAGTGCTCATTCTAAGTAATTAGCTCATAAATTTGTGTGTTTG
TGTTCAGCTGGGAGCTACAGTGGAAGAAGGTTCAGATTATTGTGTGATAACTCCGCCCAAAAAGGTGAAAACGGCAGAG
ATTGATACATATGATGATCATAGAATGGCAATGGCATTCTCTCTTGCAGCTTGTGCTGATGTTCCAATCACCATCAACG
ACTCTGGTTGCACCAGGAAAACCTTCCCCGACTACTTCCAAGTACTTGAAAGAATCACAAAGCAC**TAA**acaataaactc
tgtttttttcttctgatccaagctt

FIG. 1A

Protein sequence:

MAQVSRICNGVQNPSLISNLSKSSQRKSPLSVSLKTQQHPRAYPISSSWGLKKSGMTLIGSELRPLKVMSSVSTAE
KASEIVLQPIREISGLIKLPGSKSLSNRILLLAALSEGTTVVDNLLNSDDINYMLDALKRLGLNVETDSENNRAVV
EGCGGIFPASIDSKSDIELYLGNA**GT**AMR**P**LTAAVTAAGGNASYVLDGVPRMRERPIGDLVVGLKQLGADVECTLG
TNCPPVRVNANGGLPGGKVKLSGSISSQYLTALLMSAPLALGDVEIEIVDKLISVPYVEMTLKLMERFGVSVEHSD
SWDRFFVKGGQKYKSPGNAYVEGDASSACYFLAGAAITGETVTVEGCGTTSLQGDVKFAEVLEKMGCKVSWTENSV
TVTGPPRDAFGMRHLRAIDVNMNKMPDVAMTLAVVALFADGPTTIRDVASWRVKETERMIAICTELRKLGATVEEG
SDYCVITPPKKVKTAEIDTYDDHRMAMAFSLAACADVPITINDSGCTRKTFPDYFQVLERITKH

FIG. 1B

Arabidopsis thaliana wild type sequence:

Position	173	174	175	176	177	178	179	180	181	182	183
	L	*G*	*N*	*A*	*G*	*T*	*A*	*M*	*R*	*P*	*L*
	CTC	GGT	AAT	GCA	GGA	ACA	GCA	ATG	CGT	CCA	CTT

Arabidopsis thaliana mutant sequences:

Name											
A_{177}	CTC	GGT	AAT	GCA	GCA	ACA	GCA	ATG	CGT	CCA	CTT
	L	*G*	*N*	*A*	*A*	*T*	*A*	*M*	*R*	*P*	*L*
I_{178}	CTC	GGT	AAT	GCA	GGA	ATA	GCA	ATG	CGT	CCA	CTT
	L	*G*	*N*	*A*	*I*	*T*	*A*	*M*	*R*	*P*	*L*
$A_{177}I_{178}$	CTC	GGT	AAT	GCA	GCA	ATA	GCA	ATG	CGT	CCA	CTT
	L	*G*	*N*	*A*	*A*	*I*	*A*	*M*	*R*	*P*	*L*
$I_{178}S_{182}$	CTC	GGT	AAT	GCA	GGA	ATA	GCA	ATG	CGT	TCA	CTT
	L	*G*	*N*	*A*	*G*	*I*	*A*	*M*	*R*	*S*	*L*
$A_{177}S_{182}$	CTC	GGT	AAT	GCA	GCA	ACA	GCA	ATG	CGT	TCA	CTT
	L	*G*	*N*	*A*	*A*	*T*	*A*	*M*	*R*	*S*	*L*
$A_{177}I_{178}S_{182}$	CTC	GGT	AAT	GCA	GCA	ATA	GCA	ATG	CGT	TCA	CTT
	L	*G*	*N*	*A*	*A*	*I*	*A*	*M*	*R*	*S*	*L*
$V_{178}S_{182}$	CTC	GGT	AAT	GCA	GGA	GTA	GCA	ATG	CGT	TCA	CTT
	L	*G*	*N*	*A*	*G*	*V*	*A*	*M*	*R*	*S*	*L*
$L_{178}S_{182}$	CTC	GGT	AAT	GCA	GGA	TTA	GCA	ATG	CGT	TCA	CTT
	L	*G*	*N*	*A*	*G*	*L*	*A*	*M*	*R*	*S*	*L*
$A_{177}V_{178}$	CTC	GGT	AAT	GCA	GCA	GTA	GCA	ATG	CGT	CCA	CTT
	L	*G*	*N*	*A*	*A*	*V*	*A*	*M*	*R*	*P*	*L*
$A_{177}L_{178}$	CTC	GGT	AAT	GCA	GCA	TTA	GCA	ATG	CGT	CCA	CTT
	L	*G*	*N*	*A*	*A*	*L*	*A*	*M*	*R*	*P*	*L*

FIG. 2

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                                                                          Section 1
            (1) 1       10        20        30        40        50        60        71
.DNA.seq    (1) ATGGCGCAAGTTAGCAGAATCTGCAATGGTGTGCAGAACCCAT---CTCTTATCTCCAATCTCTCGAAATC
scdna.seq   (1) ATGGCGCAATCTAGCAGAATCTGCCATGGCGTGCAGAACCCATGTGTTATCATCTCCAATCTCTCCAAATC
icdna.seq   (1) ATGGCACAAATTAACAACATGGCTCAAGGGATACAAACCCTTA---ATCCCAATTCCAATTTCCATAAACC
epsps.seq   (1) GCGG-------------------------------------------------------------------
onsensus    (1) ATGGCGCAA TTAGCAGAATCTGCCATGG GTGCAGAACCCAT    TCTCATCTCCAATCTCTC AAATC
                                                                          Section 2
           (72) 72      80        90        100       110       120       130       142
.DNA.seq   (69) CAGTCAACGCAAATCTCC---CTTATCGGTTTCT---CTGAAGACGCAGCAGCATCCACGAGCTTATCCGA
scdna.seq  (72) CAACCAAAACAAATCACC---TTTCTCCGTCTCC---TTGAAGACGCATCAGC---CTCGAGCTT------
icdna.seq  (69) CCAAGTTCCTAAATCTTCAAGTTTTCTTGTTTTTGGATCTAAAAAACTGAAAAATTCAGCAAATT------
epsps.seq   (5) -----------------------------------------------------------------------
onsensus   (72) CAA CAAC CAAATCTCC   TTT TC GTTTCT   TTGAAGACGCAGCAGCAT CACGAGCTT
                                                                          Section 3
          (143) 143    150       160       170       180       190       200       213
.DNA.seq  (134) TTTCGTCGTCGTGGGGATTGAAGAAGAGTGGGATGACGTTAATTGGCTCTGAGCTTCGTCCTCTTAAGGTC
scdna.seq (128) ------CTTCGTGGGGATTGAAGAAGAGTGGAACGATGCTAAACGGTTCTGTAATTCGCCCGGTTAAGGTA
icdna.seq (134) ------CTATGTTGGTTTTGAAAAAAGATTCAATTTT------TATGCAAAAGTTTTGTTCCTTTAGGATT
epsps.seq   (5) ----------------------------------------GTGCCGAG-----------------------
onsensus  (143)       CTTCGTGGGGATTGAAGAAGAGTGGAATGATG TAA TGGCTCTGAG TTCGTCC  TTAAGGT
                                                                          Section 4
          (214) 214    220       230       240       250       260       270       284
.DNA.seq  (205) ATGTCTTCTGTTTCCACGGCGGAGAAAGCGTCGGAGATTGTACTTCAACCCATTAGAGAAATCTCCGGTCT
scdna.seq (193) ACAGCTTCTGTTTCCACGTCCGAGAAAGCTTCAGAGATTGTGCTTCAACCAATCAGAGAAATCTCGGGTCT
icdna.seq (193) TCAGCATCAGTGGCTACAGCACAGAAGCCTTCTGAGATAGTGTTGCAACCCATTAAAGAGATTTCAGGCAC
epsps.seq  (13) --------------------------GAGATCGTGCTGCAGCCCATCAAGGAGATCTCCGGCACCGTCAA
onsensus  (214) ACAGCTTCTGTTTCCACGGC GAGAAAGCTTC GAGATTGTGCTTCAACCCATTAGAGAAATCTCCGGTCT
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                                                                                          Section 5
                (285) 285    290        300        310        320        330        340            355
cDNA.seq        (276) TATTAAGCTTCCTGGCTCCAAGTCTCTATCAAATCGGATCCTGCTTCTCGCTGCTCTGTCTGAGGGAACAA
scdna.seq       (264) CATTAAGCTACCCGGATCCAAATCTCTCTCCAATCGGATCCTCCTTCTTGCCGCTCTATCTGAGGGAACTA
acdna.seq       (264) TGTTAAATTGCCTGGCTCTAAATCATTATCTAATAGAATTCTCCTTCTTGCTGCCTTATCTGAAGGAACAA
epsps.seq        (57) GCTGCCGGGGTCCAAGTCGCTTTCCAACCGGATCCTCCTACTCGCCGCCCTGTCCGAGGGGACAACAGTGG
Consensus       (285) TATTAAGCTGCCTGGCTCCAAATCTCTCTC AATCGGATCCTCCTTCTTGCTGCTCTGTCTGAGGGAACAA
                                                                                          Section 6
                (356) 356          370        380        390        400        410            426
cDNA.seq        (347) CTGTAGTGGACAACTTGTTGAATAGCGATGACATCAATTACATGCTTGATGCGTTGAAGAGATTGGGACTT
scdna.seq       (335) CTGTAGTGGACAACTTGTTGAACAGTGATGACATCAACTACATGCTTGATGCGTTGAAGAAGCTGGGGCTT
acdna.seq       (335) CTGTGGTTGACAATTTACTAAGTAGTGATGATATTCATTACATGCTTGGTGCCTTGAAAACACTTGGACTG
epsps.seq       (128) TTGATAACCTGCTGAACAGTGAGGATGTCCACTACATGCTCGGGGCCTTGAGGACTCTTGGTCTCTCTGTC
Consensus       (356) CTGTAGTGGACAACTTGTTGAATAGTGATGACATCAATTACATGCTTGATGCGTTGAAGAGACTGGGACTT
                                                                                          Section 7
                (427) 427          440        450        460        470        480            497
cDNA.seq        (418) AATGTGGAAACTGACAGTGAAAATAATCGTGCTGTAGTTGAAGGATGTGGCGGGATATTCCCAGCTTCCAT
scdna.seq       (406) AACGTGGAACGTGACAGTGTAAACAACCGTGCGGTTGTTGAAGGATGCGGTGGAATATTCCCAGCTTCCTT
acdna.seq       (406) CATGTAGAAGAAGATAGTGCAAACCAACGAGCTGTTGTTGAAGGTTGTGGTGGGCTTTTCCCTGTTGGTAA
epsps.seq       (199) GAAGCGGACAAAGCTGCCAAAAGAGCTGTAGTTGTTGGCTGTGGTGGAAAGTTCCCAGTTG---AGGATGC
Consensus       (427) AATGTGGAAAATGATAGTGAAAACAATCGTGCTGTTGTTGAAGGTTGTGGTGGGCTATTCCCAGCTTCTAT
                                                                                          Section 8
                (498) 498         510        520        530        540        550             568
cDNA.seq        (489) AGATTCAAAGAGTGATATCGAACTTTACCTCGGTAATGCAGGAACAGCAATGCGTCCACTTACCGCTGCGG
scdna.seq       (477) AGATTCCAAGAGTGATATTGAGTTGTACCTTGGGAATGCAGGAACAGCCATGCGTCCACTCACCGCTGCAG
acdna.seq       (477) AGAGTCCAAGGAAGAAATTCAACTGTTCCTTGGAAATGCAGGAACAGCAATGCGGCCACTAACAGCAGCAG
epsps.seq       (267) TAAAGAGGAAGTGCAGCTCTTCTTGGGGAATGCTGGAACTGCAATGCGGCCATTGACAGCAGCTGTTACTG
Consensus       (498) AGATTCCAAGGGTGATATTGAATTGTACCTTGGTAATGCAGGAACAGCAATGCGTCCACTAACCGCTGCAG
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                                                                            Section 9
          (569) 569        580        590        600        610        620              639
   DNA.seq (560) TCACTGCTGCAGGTGGAAACGCAAGTTATGTGCTTGATGGGGTGCCTCGTATGAGAGAAAGACCTATAGGG
  cdna.seq (548) TTACAGCTGCAGGTGGCAACGCGAGTTATGTACTTGATGGGGTGCCTAGAATGAGGGAAAGACCTATAGGA
  cdna.seq (548) TTACTGTAGCTGGTGGAAATTCAAGGTATGTACTTGATGGAGTTCCTCGAATGAGAGAGAGACCAATTAGT
  psps.seq (338) CTGCTGGTGGAAATGCAACTTACGTGCTTGATGGAGTACCAAGAATGAGGGAGAGACCCATTGGCGACTTG
 onsensus (569) TTACTGCTGCAGGTGGAAATTCAAGTTATGTACTTGATGGGGTGCCTCGAATGAGAGAAAGACCTATAGGG
                                                                           Section 10
          (640) 640        650        660        670        680        690        700        710
   DNA.seq (631) GATTTGGTTGTTGGTCTTAAGCAGCTTGGTGCTGATGTTGAATGTACTCTTGGAACTAACTGCCCTCCTGT
  cdna.seq (619) GATTTGGTTGTTGGTCTTAAGCAGCTTGGTGCTGATGTTGAGTGTACTCTTGGCACTAACTGTCCTCCTGT
  cdna.seq (619) GATTTGGTTGATGGTCTTAAACAGCTTGGTGCAGAGGTTGATTGTTTCCTTGGTACGAAATGTCCTCCTGT
  psps.seq (409) GTTGTCGGATTGAAGCAGCTTGGTGCAGATGTTGATTGTTTCCTTGGCACTGACTGCCCACCTGTTCGTGT
 onsensus (640) GATTTGGTTGTTGGTCTTAAGCAGCTTGGTGCTGATGTTGA TGTACTCTTGGCACTAACTGTCCTCCTGT
                                                                           Section 11
          (711) 711        720        730        740        750        760        770        781
   DNA.seq (702) TCGTGTCAACGCTAATGGTGGCCTTCCCGGTGGAAAGGTGAAGCTTTCTGGATCAATTAGTAGTCAGTACT
  cdna.seq (690) TCGTGTCAATGCTAATGGTGGCCTTCCCGGTGGAAAGGTGAAGCTTTCTGGATCGATCAGTAGTCAGTACT
  cdna.seq (690) TCGAATTGTCAGCAAGGGAGGTCTTCCTGGAGGGAAGGTCAAGCTCTCTGGATCCATTAGCAGCCAATACT
  psps.seq (480) CAATGGAATCGGAGGGCTACCTGGTGGCAAGGTCAAGCTGTCTGGCTCCATCAGCAGTCAGTACTTGAGTG
 onsensus (711) TCGTGTCATCGGTAATGGTGGTCTTCCCGGTGGAAAGGTGAAGCTTTCTGGATCCATTAGTAGTCAGTACT
                                                                           Section 12
          (782) 782       790        800        810        820        830        840        852
   DNA.seq (773) TGACTGCTCTGCTCATGTCTGCTCCCTTAGCTCTTGGAGACGTCGAGATTGAGATTGTCGATAAATTAATT
  cdna.seq (761) TGACTGCCCTCCTCATGGCAGCTCCTTTAGCTCTTGGAGACGTGGAGATTGAGATCATTGATAAACTGATA
  cdna.seq (761) TGACTGCTCTGCTTATGGCTGCTCCACTGGCTTTAGGAGATGTGGAGATTGAAATCATTGACAAACTAATT
  psps.seq (551) CCTTGCTGATGGCTGCTCCTTTGGCTCTTGGGGATGTGGAGATTGAAATCATTGATAAATTAATCTCCATT
 onsensus (782) TGACTGCTCTGCTTATGGCTGCTCCTTTAGCTCTTGGAGACGTGGAGATTGAGATTATTGATAAATTAATT
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                                                                          Section 13
         (853) 853    860       870       880       890       900       910          923
DNA.seq   (844) TCTGTTCCATATGTTGAAATGACATTGAAGTTGATGGAACGTTTCGGGGTTAGTGTCGAGCATAGTGATAG
cdna.seq  (832) TCTGTTCCATATGTTGAAATGACATTGAAGTTGATGGAGCGTTTTGGTGTTAGTGCCGAGCATAGTGATAG
cdna.seq  (832) AGTGTACCTTATGTCGAGATGACATTGAAGTTGATGGAGCGATTTGGTATTTCTGTGGAGCACAGTAGTAG
psps.seq  (622) CCGTACGTCGAAATGACATTGAGATTGATGGAGCGTTTTGGTGTGAAAGCAGAGCATTCTGATAGCTGGGA
nsensus   (853) TCTGTTCCATATGTTGAAATGACATTGAAGTTGATGGAGCGTTTTGGTGTTAGTGTCGAGCATAGTGGTAG
                                                                          Section 14
         (924) 924   930       940       950       960       970       980          994
DNA.seq   (915) CTGGGATCGTTTCTTTGTCAAGGGCGGCAAAAATACAAGTCTCCGGGTAATGCGTATGTAGAAGGTGATG
cdna.seq  (903) CTGGGATCGTTTCTTTGTCAAGGGCGGTCAGAAATACAAGTCGCCTGGTAATGCTTATGTAGAAGGTGATG
cdna.seq  (903) CTGGGACAGGTTCTTTGTCCGAGGAGGTCAGAAATACAAGTCTCCTGGAAAAGCTTTTGTCGAAGGTGATG
psps.seq  (693) CAGATTCTACATTAAGGGAGGTCAAAAATACAAGTCCCCTAAAAATGCCTATGTTGAAGGTGATGCCTCAA
nsensus   (924) CTGGGATCGTTTCTTTGTCAGGGGCGGTCAGAAATACAAGTCTCCTGGTAATGCTTATGTAGAAGGTGATG
                                                                          Section 15
         (995) 995  1000      1010      1020      1030      1040      1050         1065
DNA.seq   (986) CTTCTAGTGCATGTTATTTCTTGGCTGGTGCTGCCATTACCGGTGAAACTGTCACAGTCGAAGGTTGTGGA
cdna.seq  (974) CTTCTAGTGCTAGCTATTTCTTGGCTGGTGCTGCCATTACTGGTGAAACTGTTACTGTCGAAGGTTGTGGA
cdna.seq  (974) CTTCAAGTGCTAGCTACTTCTTGGCTGGTGCAGCAGTCACAGGTGGAACTATCACTGTTGAAGGTTGTGGG
psps.seq  (764) GCGCAAGCTATTTCTTGGCTGGTGCTGCAATTACTGGAGGGACTGTGACTGTGGAAGGTTGTGGCACCACC
nsensus   (995) CTTCTAGTGCTTGCTATTTCTTGGCTGGTGCTGCCGTTAC GGTGAAACTGTCACTGTTGAAGGTTGTGGA
                                                                          Section 16
        (1066) 1066          1080      1090      1100      1110      1120         1136
DNA.seq  (1057) ACTACCAGCTTGCAGGGAGATGTAAAATTCGCCGAGGTCCTTGAGAAAATGGGATGTAAAGTGTCCTGGAC
cdna.seq (1045) ACAACTAGCCTCCAGGGAGATGTGAAATTCGCAGAGGTTCTTGAGAAAATGGGATGTAAAGTGTCATGGAC
cdna.seq (1045) ACAAACAGTTTACAGGGGGATGTCAAATTTGCTGAGGTACTTGAAAAAATGGGAGCTGAAGTTACGTGGAC
psps.seq  (835) AGTTTGCAGGGTGATGTGAAGTTTGCTGAGGTACTGGAGATGATGGGAGCGAAGGTTACATGGACCGAGAC
nsensus  (1066) ACTACCAGCTT CAGGGGGATGT AAATTCGCAGAGGT CTTGAGAAAATGGGATGTAAAGTGTCCTGGAC
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                                                                                      Section 17
             (1137) 1137                 1150        1160        1170        1180        1190              1207
      :DNA.seq (1128) AGAGAACAGTGTGACTGTGACAGGACCACCTAGAGATGCTTTTGGAATGAGACACTTGCGGGCTATTGATG
     scdna.seq (1116) AGAGAACAGTGTGACTGTGACTGGACCATCAAGAGATGCTTTTGGAATGAGGCACTTGCGTGCTGTTGATG
     acdna.seq (1116) AGAGAACAGTGTCACAGTCAAAGGACCTCCAAGGAGTTCTTCTGGGAGGAAGCATTTGCGTGCCATTGATG
     epsps.seq  (906) TAGCGTAACTGTTACTGGCCCACCGCGGGAGCCATTTGGGAGGAAACACCTCAAGGCGATTGATGTCAACA
     onsensus (1137) AGAGAACAGTGTGACTGTGACAGGACCACCAAGAGATGCTTTTGGAATGAGGCACTTGCGTGCTGTTGATG
                                                                                      Section 18
             (1208) 1208         1220        1230        1240        1250        1260              1278
      :DNA.seq (1199) TCAACATGAACAAAATGCCTGATGTAGCCATGACCCTTGCCGTCGTTGCTCTCTTTGCTGACGGTCCAACC
     scdna.seq (1187) TCAACATGAACAAAATGCCTGATGTAGCCATGACTCTAGCCGTTGTTGCTCTCTTTGCCGATGGTCCAACC
     acdna.seq (1187) TGAACATGAATAAAATGCCTGATGTTGCCATGACACTTGCTGTTGTTGCACTTTATGCTGATGGTCCCACA
     epsps.seq  (977) TGAACAAGATGCCTGATGTCGCCATGACTCTTGCTGTGGTTGCCCTCTTTGCCGATGGCCCGACAGCCATC
     onsensus (1208) TGAACATGAACAAAATGCCTGATGTAGCCATGACTCTTGCTGTTGTTGCTCTCTTTGCTGATGGTCCCACC
                                                                                      Section 19
             (1279) 1279        1290        1300        1310        1320        1330              1349
      :DNA.seq (1270) ACCATTAGAGATGTGGCTAGCTGGAGAGTAAAGGAGACAGAAAGGATGATTGCCATTTGCACAGAGCTTAG
     scdna.seq (1258) ACCATCAGAGATGTGGCTAGCTGGAGAGTTAAGGAGACAGAGAGGATGATTGCCATTTGCACAGAGCTTAG
     acdna.seq (1258) GCTATAAGAGATGTTGCTAGCTGGAGAGTCAAGGAAACTGAGCGCATGATCGCCATATGCACAGAACTTAG
     epsps.seq (1048) AGAGACGTGGCTTCCTGGAGAGTAAAGGAGACCGAGAGGATGGTTGCGATCCGGACGGAGCTAACCAAGCT
     onsensus (1279) ACCATCAGAGATGTGGCTAGCTGGAGAGT AAGGAGACAGAGAGGATGATTGCCATTTGCACAGAGCTTAG
                                                                                      Section 20
             (1350) 1350        1360        1370        1380        1390        1400        1410      1420
      :DNA.seq (1341) AAAACTGGAGCTACAGTGGAAGAAGGTTCAGATTATTGTGTGATAACTCCGCCCAAAAAGGTGAAAACGG
     scdna.seq (1329) AAAGCTTGGAGCTACAGTGGAAGAAGGTTCAGATTATTGTGTGATAACTCCACCAGCAAAGGTGAAACCGG
     acdna.seq (1329) GAAGTTAGGAGCAACCGTTGAAGAAGGACCAGACTACTGCATAATCACCCCACCGGAGAAACTAAATGTGA
     epsps.seq (1119) GGGAGCATCTGTTGAGGAAGGGCCGGACTACTGCATCATCACGCCGCCGGAGAAGCTGAACGTGACGGCGA
     onsensus (1350) GAAGCTAGGAGCTACAGTGGAAGAAGGTTCAGATTATTGTGTGATAACTCCGCCGGAGAAGGTGAAAGCGG
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                                                                                  Section 21
              (1421) 1421      1430      1440      1450      1460      1470      1480      1491
   cDNA.seq (1412) CAGAGATTGATACATATGATGATCATAGAATGGCAATGGCATTCTCTCTTGCAGCTTGTGCTGATGTTCCA
  scdna.seq (1400) CGGAGATTGATACGTATGATGATCATAGAATGGCGATGGCGTTCTCGCTTGCAGCTTGTGCTGATGTTCCA
  acdna.seq (1400) CCGATATTGATACATACGATGATCACAGGATGGCCATGGCTTTTTCTCTTGCTGCTTGTGCAGATGTTCCC
  epsps.seq (1190) TCGACACGTACGACGACCACAGGATGGCCATGGCCTTCTCCCTTGCCGCCTGTGCCGAGGTCCCCGTCACC
  Consensus (1421) CCGAGATTGATACATATGATGATCATAGAATGGCCATGGC TTTTCTCTTGCTGCTTGTGCTGATGTTCCC
                                                                                  Section 22
              (1492) 1492   1500      1510      1520      1530      1540      1550      1562
   cDNA.seq (1483) ATCACCATCAACGACTCTGGTTGCACCAGGAAAACCTTCCCCGACTACTTCCAAGTACTTGAAAGAATCAC
  scdna.seq (1471) GTCACCATCAAGGATCCTGGCTGCACCAGGAAGACTTTCCCTGACTACTTCCAAGTCCTTGAAAGTATCAC
  acdna.seq (1471) GTCACCATCAATGACCCTGGCTGCACGCGGAAAACCTTCCCTAACTACTTTGATGTACTTCAGCAGTACTC
  epsps.seq (1261) ATCCGGGACCCTGGGTGCACCCGGAAGACCTTCCCCGACTACTTCGATGTGCTGAGCACTTTCGTCAAGAA
  Consensus (1492) GTCACCATCAATGACTCTGGCTGCACGAGGAAAACCTTCCCTGACTACTTCCAAGTCCTTGAAAG ATCAC
                                                                                  Section 23
              (1563) 1563     1572
   cDNA.seq (1554) AAAGCACTAA
  scdna.seq (1542) AAAGCATTAA
  acdna.seq (1542) CAAGCATTGA
  epsps.seq (1332) TTAA------
  Consensus (1563) AAAGCATTAA
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                                                                               Section 1
          (1) 1       10        20        30        40        50        60           74
   PRO    (1) MAQVSRICNGVQNP-SLISNLSKSSQRKSPLSVSLKTQQHPRAYPISSSWGLKKSGMTLIGSELR------PLK
   PRO    (1) MAQSSRICHGVQNPCVIISNLSKSNQNKSPFSVSLKTHQ-----PRASSWGLKKSGTMLNGSVIR------PVK
   PRO    (1) MAQINNMAQGIQTL-NPNSNFHKPQVPKSSSFLVFGSKK-----LKNSA-----NSMLVLKKDSIFMQKFCSFR
   PRO    (1) AG------------------------------------------------------------------------
 ensus    (1) MAQISRICNGVQNP  IISNLSKSNQ KSP SVSLKT Q     PKASSWGLKKSGMLLIGSDIR      PLK
                                                                               Section 2
         (75) 75  80        90        100       110       120       130              148
   PRO   (68) VMSSVSTAEKASEIVLQPIREISGLIKLPGSKSLSNRILLLAALSEGTTVVDNLLNSDDINYMLDALKRLGLNV
   PRO   (64) VTASVSTSEKASEIVLQPIREISGLIKLPGSKSLSNRILLLAALSEGTTVVDNLLNSDDINYMLDALKKLGLNV
   PRO   (64) ISASVATAQKPSEIVLQPIKEISGTVKLPGSKSLSNRILLLAALSEGTTVVDNLLSSDDIHYMLGALKTLGLHV
   PRO    (3) ----------AEEIVLQPIKEISGTVKLPGSKSLSNRILLLAALSEGTTVVDNLLNSEDVHYMLGALRTLGLSV
 ensus   (75) VSASVSTAEKASEIVLQPIKEISGTIKLPGSKSLSNRILLLAALSEGTTVVDNLLNSDDINYMLGALKTLGLNV
                                                                               Section 3
        (149) 149       160       170       180       190       200       210        222
   PRO  (142) ETDSENNRAVVEGCGGIFPASIDSKSDIELYLGNAGTAMRPLTAAVTAAGGNASYVLDGVPRMRERPIGDLVVG
   PRO  (138) ERDSVNNRAVVEGCGGIFPASLDSKSDIELYLGNAGTAMRPLTAAVTAAGGNASYVLDGVPRMRERPIGDLVVG
   PRO  (138) EEDSANQRAVVEGCGGLFPVGKESKEEIQLFLGNAGTAMRPLTAAVTVAGGNSRYVLDGVPRMRERPISDLVDG
   PRO   (67) EADKAAKRAVVVGCGGKFPV-EDAKEEVQLFLGNAGTAMRPLTAAVTAAGGNATYVLDGVPRMRERPIGDLVVG
 ensus  (149) E DSANNRAVVEGCGGIFPVSIDSKSDIQLFLGNAGTAMRPLTAAVTAAGGNASYVLDGVPRMRERPIGDLVVG
                                                                               Section 4
        (223) 223     230       240       250       260       270       280          296
   PRO  (216) LKQLGADVECTLGTNCPPVRVNANGGLPGGKVKLSGSISSQYLTALLMSAPLALGDVEIEIVDKLISVPYVEMT
   PRO  (212) LKQLGADVECTLGTNCPPVRVNANGGLPGGKVKLSGSISSQYLTALLMAAPLALGDVEIEIIDKLISVPYVEMT
   PRO  (212) LKQLGAEVDCFLGTKCPPVRIVSKGGLPGGKVKLSGSISSQYLTALLMAAPLALGDVEIEIIDKLISVPYVEMT
   PRO  (140) LKQLGADVDCFLGTDCPPVRVNGIGGLPGGKVKLSGSISSQYLSALLMAAPLALGDVEIEIIDKLISIPYVEMT
 ensus  (223) LKQLGADVDCTLGTNCPPVRVNANGGLPGGKVKLSGSISSQYLTALLMAAPLALGDVEIEIIDKLISVPYVEMT
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                                                                          Section 5
(297) 297          310       320       330       340       350       360       370
PRO (290) LKLMERFGVSVEHSDSWDRFFVKGGQKYKSPGNAYVEGDASSACYFLAGAAITGETVTVEGCGTTSLQGDVKFA
PRO (286) LKLMERFGVSAEHSDSWDRFFVKGGQKYKSPGNAYVEGDASSASYFLAGAAITGETVTVEGCGTTSLQGDVKFA
PRO (286) LKLMERFGISVEHSSSWDRFFVRGGQKYKSPGKAFVEGDASSASYFLAGAAVTGGTITVEGCGTNSLQGDVKFA
PRO (214) LRLMERFGVKAEHSDSWDRFYIKGGQKYKSPKNAYVEGDASSASYFLAGAAITGGTVTVEGCGTTSLQGDVKFA
ensus (297) LKLMERFGVSVEHSDSWDRFFVKGGQKYKSPGNAYVEGDASSASYFLAGAAITGGTVTVEGCGTTSLQGDVKFA
                                                                          Section 6
(371) 371     380       390       400       410       420       430             444
PRO (364) EVLEKMGCKVSWTENSVTVTGPPRDAFGMRHLRAIDVNMNKMPDVAMTLAVVALFADGPTTIRDVASWRVKETE
PRO (360) EVLEKMGCKVSWTENSVTVTGPSRDAFGMRHLRAVDVNMNKMPDVAMTLAVVALFADGPTTIRDVASWRVKETE
PRO (360) EVLEKMGAEVTWTENSVTVKGPPRSSSGRKHLRAIDVNMNKMPDVAMTLAVVALYADGPTAIRDVASWRVKETE
PRO (288) EVLEMMGAKVTWTETSVTVTGPPREPFGRKHLKAIDVNMNKMPDVAMTLAVVALFADGPTAIRDVASWRVKETE
ensus (371) EVLEKMGCKVSWTENSVTVTGPPRDAFGRKHLRAIDVNMNKMPDVAMTLAVVALFADGPTTIRDVASWRVKETE
                                                                          Section 7
(445) 445  450       460       470       480       490       500               518
PRO (438) RMIAICTELRKLGATVEEGSDYCVITPPKKVKTAEIDTYDDHRMAMAFSLAACADVPITINDSGCTRKTFPDYF
PRO (434) RMIAICTELRKLGATVEEGSDYCVITPPAKVKPAEIDTYDDHRMAMAFSLAACADVPVTIKDPGCTRKTFPDYF
PRO (434) RMIAICTELRKLGATVEEGPDYCIITPPEKLNVTDIDTYDDHRMAMAFSLAACADVPVTINDPGCTRKTFPNYF
PRO (362) RMVAIRTELTKLGASVEEGPDYCIITPPEKLNVTAIDTYDDHRMAMAFSLAACAEVPVTIRDPGCTRKTFPDYF
ensus (445) RMIAICTELRKLGATVEEGSDYCIITPPEKLNVTEIDTYDDHRMAMAFSLAACADVPVTINDPGCTRKTFPDYF
                                                                          Section 8
(519) 519     527
PRO (512) QVLERITKH
PRO (508) QVLESITKH
PRO (508) DVLQQYSKH
PRO (436) DVLSTFVKN
ensus (519) QVLESITKH
```

Oligo Name	Oligo Sequence (5'→3')
ATEPS-A_{177}	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAGTGGACGCATTGCTGT**TGC**TGCATTACCGAG
ATEPS-AI	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAGTGGACGCATTGC**TATTGC**TGCATTACCGAG
ATEPS-IS	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAG**TGA**ACGCATTGC**TAT**TCCTGCATTACCGAG
ATEPS-AS	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAG**TGA**ACGCATTGCTGT**TGC**TGCATTACCGAG
ATEPS-AIS	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAG**TGA**ACGCATTGC**TATTGC**TGCATTACCGAG
ATEPS-I_{177}	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAGTGGACGCATTGCTGT**TAT**TGCATTACCGAG
ATEPS-VS	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAG**TGA**ACGCATTGC**TAC**TCCTGCATTACCGAG
ATEPS-LS	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAG**TGA**ACGCATTGC**TAA**TCCTGCATTACCGAG
ATEPS-AV	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAGTGGACGCATTGC**TACTGC**TGCATTACCGAG
ATEPS-AL	CGTTTCCACCTGCAGCAGTGACCGCAGCGGTAAGTGGACGCATTGC**TAATGC**TGCATTACCGAG

FIG. 5

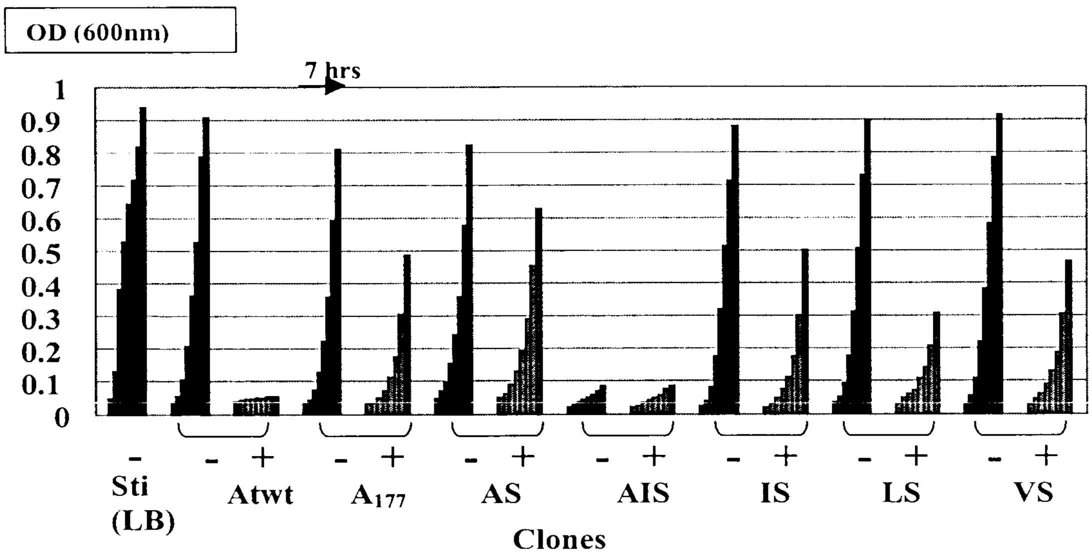
OD (600nm)
7 hrs
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
- Sti (LB)
- + Atwt
- + A177
- + AS
- + AIS
- + IS
- + LS
- + VS
Clones

FIG. 6

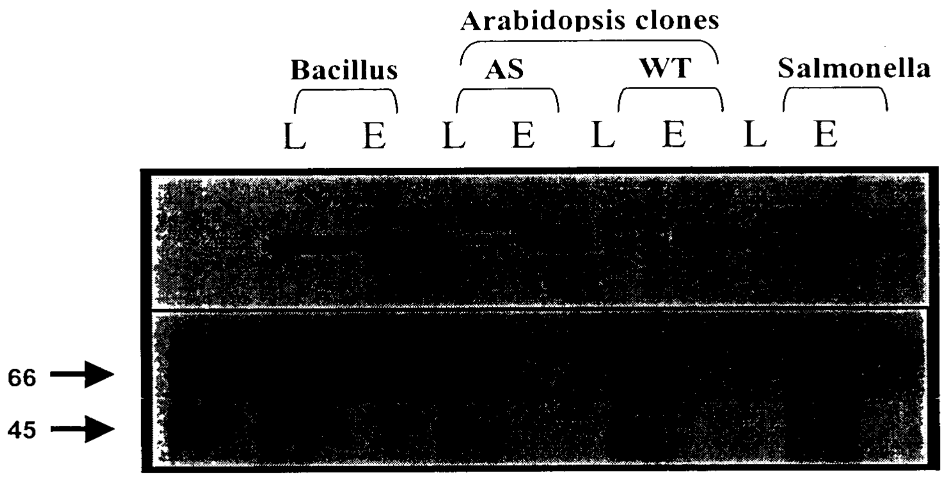
Arabidopsis clones
Bacillus
AS
WT
Salmonella
L E L E L E L E
66
45

FIG. 7